Section 1.0 Background

1.1 Legal Authority

EPA is proposing the Western Alkaline Coal Mining Subcategory under the authority of Sections 301, 304, 306, 307, 308, and 501 of the Federal Water Pollution Control Act (Clean Water Act; CWA). EPA is proposing this subcategory also under Section 304(m) of the Clean Water Act which requires EPA to publish a biennial Effluent Guidelines Plan, set a schedule for review and revision of existing regulations and identify categories of dischargers to be covered by new regulations.

EPA's legal authority to promulgate BMP regulations is found in Section 304(e), Section 307(b) and (c), Section 308(a), Section 402(a)(1)(B), Section 402(a)(2) and Section 501(a) of the Clean Water Act, 33 U.S.C. § 1251, et. seq. EPA's legal authority also relies on 40 CFR part 122.44(k). This BMP regulation is consistent with the Pollution Prevention Act of 1990, 42 U.S.C. § 13101, et. seq.

This subcategory is being proposed in response to the consent decree in NRDC et. al. v. Browner (D.D.C. Civ. No. 89-2980, January 31, 1992, as modified) which commits EPA to schedules for proposing and taking final action on effluent limitations guidelines. The consent decree publication date for proposal of revised effluent limitations guidelines for the coal mining industry were published on May 28, 1998 at 63 FR 29203.

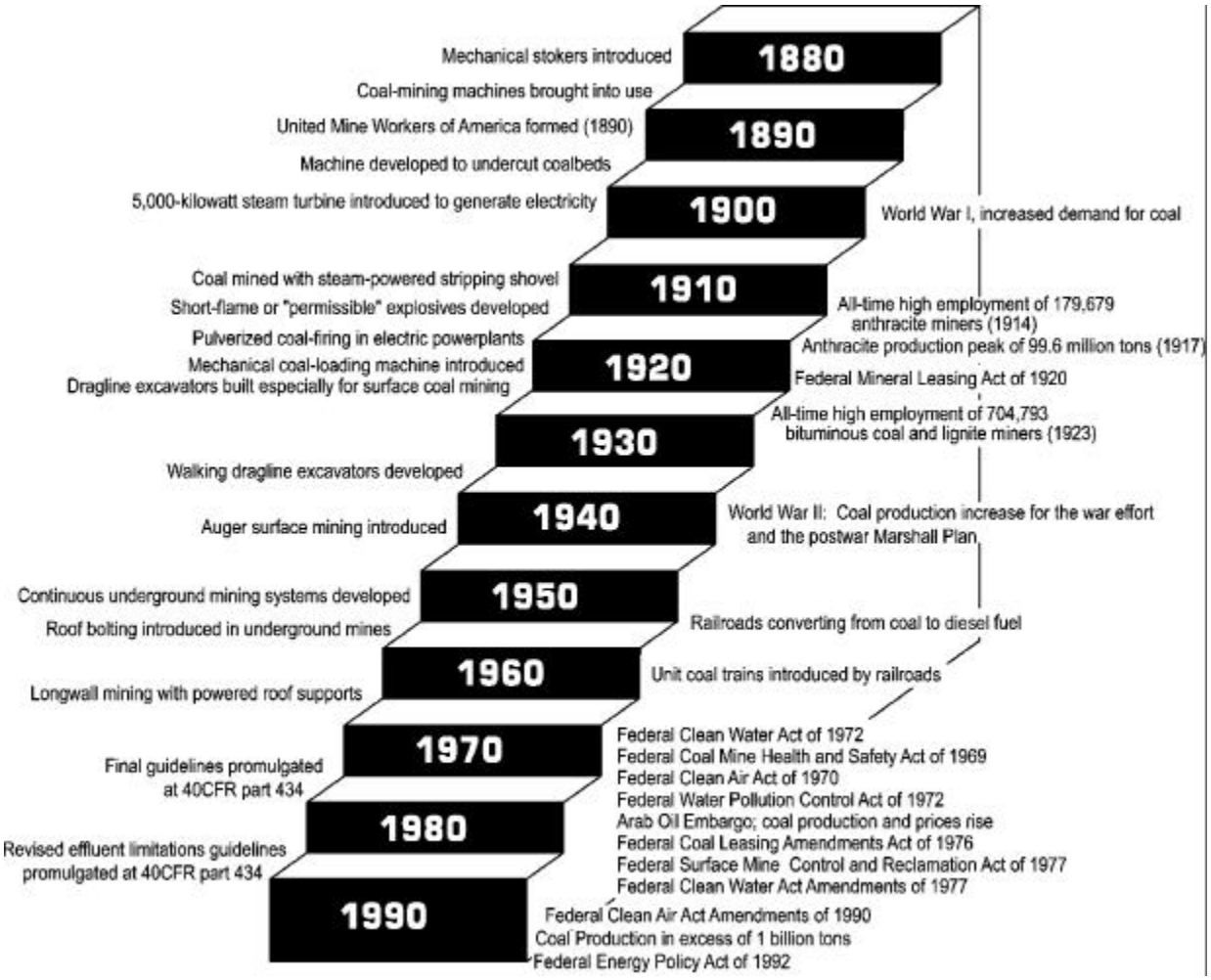
1.2 Regulatory History

The coal mining industry in the United States has a history covering over two centuries with no particular consideration given to its effect on the environment until recently. During the last thirty years, the proliferation of federal environmental laws has altered the coal mining

industry (Figure 1a). Environmental impact considerations are now commonly woven into most government and industry decision-making. Laws such as the Surface Mining Control and Reclamation Act (SMCRA) and the Clean Water Act (CWA) reflect a strong current of public opinion favoring preservation of resources and protection of fragile and life-supporting ecosystems. EPA is charged with administering most federal environmental laws, but EPA may delegate authority to states and tribal organizations that develop their own environmental protection agencies to enforce the minimum federal standards or, depending on the location, more stringent state or tribal standards.

Coal mine operators are issued a surface mining permit under SMCRA and a National Pollutant Discharge Elimination System (NPDES) permit under CWA. Allowable pollutant discharge levels are usually determined by EPA's technology-based standards, or are based on more stringent water quality standards. NPDES permits on surface mines usually require monitoring of pH, total suspended solids, total iron, and total manganese. The regulatory authority responsible for a particular mining situation may require monitoring of other parameters.

Figure 1a: Time line of Selected Mining Regulations Affecting the Coal Mining Industry (modified from EIA, 1995)



This section presents a summary of SMCRA and CWA regulations affecting the coal mining industry and, in particular, sedimentation requirements in the arid and semiarid western coal mining region. This section also describes selected state programs that deal successfully with sedimentation issues of coal mines in arid and semiarid regions.

1.2.1 Clean Water Act

The Clean Water Act of 1972 and the Clean Water Act Amendments of 1977 established a comprehensive program to "restore and maintain the chemical, physical, and biological integrity of the Nation's waters." To implement the program, EPA was charged with issuing effluent limitation guidelines standards, pretreatment standards, and new source performance standards (NSPS) for industrial discharges. These regulations were to be based principally on the degree of effluent reduction attainable through the application of control technologies.

On October 17, 1975 (40 FR 48830), EPA proposed regulations adding part 434 to Title 40 of the Code of Federal Regulations. These regulations, with subsequent amendments, established effluent limitations guidelines for coal mine operations based on the use of the "best practicable control technology currently available" (BPT) for existing sources in the coal mining point source category. These regulations were followed on April 26, 1977 (42 FR 21380) by final BPT effluent limitations guidelines for the coal mining point source category. BPT guidelines were established for total suspended solids, pH, total iron, and/or total manganese for three subcategories: Acid Mine Drainage, Alkaline Mine Drainage, and Coal Preparation Plants and Associated Areas. At that time the guidelines did not apply to discharges from reclamation areas, nor did TSS limitations apply to any discharges from coal mines located in Colorado, Montana, North Dakota, South Dakota, Utah, and Wyoming.

On October 9, 1985 (50 FR 41296), EPA promulgated the revised effluent limitations guidelines and standards that are in effect to date under 40 CFR part 434. Currently, there are four subcategories: Coal Preparation Plants and Coal Preparation Plant Associated Areas, Acid or Ferruginous Mine Drainage, Alkaline Mine Drainage, and Post-Mining Areas, along with a

subpart for Miscellaneous Provisions with BPT, BAT, and NSPS limitations for TSS, pH, total iron, total manganese, and settleable solids (SS). Specifically, effluent limitations for discharges from reclamation areas include SS and pH at 0.5 ml/L and 6 to 9 standard units, respectively.

On October 18, 1997, Vice President Gore called for a renewed effort to restore and protect water quality. EPA and other federal agencies were directed to develop a Clean Water Action Plan that addressed three major goals: (1) enhanced protection from public health threats caused by water pollution; (2) more effective control of polluted runoff; and (3) promotion of water quality protection on a watershed basis. The Clean Water Action Plan was to be based on three principles:

- Develop cooperative approaches that promote coordination and reduce duplication among federal, state, and local agencies and tribal governments wherever possible;

- Maximize the participation of community groups and the public, placing particular emphasis on ensuring community and public access to information about water quality issues; and

- Emphasize innovative approaches to pollution control, including incentives, market-based mechanisms, and cooperative partnerships with landowners and other private parties.

Based on the efforts of interagency work groups and comments from the public, EPA and other federal agencies developed the final Clean Water Action Plan that was submitted on February 14, 1998. One of several Key Actions specifically identified to implement the goals of the Clean Water Action Plan was EPA's project to re-examine 40 CFR part 434 to better address coal mining in arid western areas.

On May 28, 1998 (63 FR 29203), EPA announced plans for developing new and revised effluent limitations guidelines for selected industrial categories, and described revisions to its regulations development process. Included in this program was the re-examination of 40 CFR part 434. The program and schedule announced in May 1998 were established in response to a consent decree resulting from legal action taken by the Natural Resources Defense Council (D.D.C. No. 89-2980, January 31, 1992).

1.2.2 Surface Mining Control and Reclamation Act (SMCRA)

1.2.2.1 SMCRA History

In 1977, Congress enacted the Surface Mining Control and Reclamation Act, 30 U.S.C. 1201 *et seq*, to address the environmental problems associated with coal mining. The previous lack of uniformity among state surface mining programs and the increase in unreclaimed land and associated pollution of water and other resources forced the federal regulation of surface coal mining activities. SMCRA established a coordinated effort between the states and the federal government to prevent the abuses that had characterized surface and underground coal mining in the past, and created two major programs:

- An environmental protection program to establish standards and procedures for approving permits and inspecting active coal mining and reclamation operations both surface and underground; and

- A reclamation program for abandoned mine lands, funded by fees on coal production, to reclaim land and water resources adversely affected by pre-1977 coal mining.

SMCRA created the Office of Surface Mining Reclamation and Enforcement within the Department of Interior, and charged it with the responsibility of preparing regulations and providing financial and technical assistance to the states to carry out regulatory activities. Title V

of the statute gives OSMRE broad authority to regulate specific management practices before, during, and after mining operations. OSMRE has promulgated comprehensive regulations to control both surface coal mining and the surface effects of underground coal mining (30 CFR part 700 *et seq*). Implementation of these requirements has led to significant improvements in mining practices and serves to control the pollution of water and other resources.

1.2.2.2 SMCRA Requirements

SMCRA requirements set general performance standards for environmental protection for any permit to conduct surface coal mining and reclamation operations. The performance standards that are particularly applicable to the proposed Western Alkaline Coal Mining Subcategory are summarized as follows:

- Restore the land affected to a condition capable of supporting the uses which it was capable of supporting prior to mining, or higher or better uses;

- Stabilize and protect all surface areas affected by the mining and reclamation operation to effectively control erosion;

- Create, if authorized in the approved mining and reclamation plan and permit, permanent impoundments of water on mining sites as part of reclamation activities only when it is adequately demonstrated that: such water impoundments will not result in the diminution of the quality or quantity of water utilized by adjacent or surrounding landowners for agricultural, industrial recreational, or domestic uses;

- Minimize disturbance to the hydrologic balance at the mine-site and in associated offsite areas and to the quality and quantity of water in surface and ground water systems both during and after surface coal mining operations and during reclamation;

- Establish an effective, permanent vegetative cover at least equal in extent of cover to natural vegetation or as necessary to achieve the approved postmining land use;

- In those areas or regions where the annual average precipitation is twenty-six inches or less, assume the responsibility for successful revegetation for a period of ten full years;

- Protect offsite areas from slides or damage occurring during the surface coal mining and reclamation operations;

- Meet other criteria as necessary to achieve reclamation in accordance with SMCRA, taking into consideration the physical, climatological, and other characteristics of the site; and

- To the extent possible using the best technology currently available, minimize disturbances and adverse impacts of the operation on fish, wildlife, and related environmental values, and achieve enhancement of such resources where practicable.

Each SMCRA permit includes detailed pre-mining baseline conditions, a prediction of the probable hydrologic consequences of mining on the hydrologic balance, a hydrologic reclamation plan designed to minimize predicted consequences, and a detailed monitoring plan to verify and characterize hydrologic consequences. However, meeting numeric effluent limitations under the CWA has taken precedence over SMCRA's requirement to minimize, to the extent possible, impacts to the hydrologic balance. This precedent has, at times, resulted in adverse environmental effects and impacts to the hydrologic balance.

Under SMCRA, coal mine operators are required to collect a minimum of one year of pre-mining or baseline surface and ground water monitoring data before submitting a coal mining

and reclamation permit application. The baseline information is used to prepare site-specific erosion and sedimentation plans capable of minimizing adverse impacts within the permit area and adjacent lands. It is also used to perform a Probable Hydrologic Consequences (PHC) evaluation to identify regional hydrologic impacts associated with the coal mining and reclamation operation. When potential adverse impacts are identified, appropriate protection, mitigation, and rehabilitation plans are developed and included in mining and reclamation permit requirements. The PHC and the accompanying plans are reviewed and approved by regulatory authorities before mining and reclamation activities are initiated.

Coal mine operators are required to submit bonds covering the costs of reclaiming and restoring disturbed areas to acceptable environmental conditions in the event of default and failure to discharge this obligation. During the 5-year life of the permit, the coal mining and reclamation operations are inspected at a minimum on a monthly basis. Mid-term mining and reclamation permit reviews and renewals assess the adequacy of the site's erosion and sedimentation control, treatment, mitigation, and rehabilitation.

Coal mine operators are required to conduct and submit the results of surface and ground water monitoring under SMCRA and CWA NPDES permits on a periodic basis. Monitoring results are used to assess the adequacy of erosion and sedimentation control measures. At the conclusion of mining and reclamation activities, surface water monitoring information is used to summarize the effectiveness of erosion and sedimentation control in restoring the hydrologic system. This evaluation is part of a Cumulative Hydrologic Impact Assessment (CHIA) required when the coal mining company applies for final reclamation liability and bond release.

1.2.2.3 Flannery Decision

SMCRA requirements include performance standards for surface mining operations to be conducted in a manner that minimizes disturbance to the prevailing hydrologic balance. SMCRA specifies sediment control performance standards for

> "conducting surface coal mining operations so as to prevent, to the extent possible using best technology currently available (BTCA), additional contributions of suspended solids to stream flow, or to runoff outside the permit area. In no event shall contributions be in excess of requirements set by applicable state or federal law (30 U.S.C. § 1265(b)(10)(B)(i))."

OSMRE implemented the statutory hydrologic balance protection performance standard by requiring, with some exceptions, that all surface drainage from disturbed areas pass through sedimentation ponds before leaving the permit area (30 CFR part 816.42(a)(1) and 817.42(a)(1)).

In 1981 (46 FR 34784), OSMRE proposed revisions to the siltation structure regulations that incorporated the flexibility to allow the use of alternative sediment control measures in lieu of sedimentation ponds. OSMRE received extensive comments on the question of whether sedimentation ponds and similar siltation structures constitute BTCA in all circumstances. A number of comments maintained and supported with data the premise that sedimentation ponds not only are unnecessary in all cases to meet the statutory requirement to prevent "additional contributions of suspended solids," but also, in certain circumstances, cause both short and long term harm to the hydrologic balance. Despite the supporting comments, the final rule promulgated in 1983 deleted the provision that allowed alternative sediment control measures, and retained the prior requirement that all drainage from disturbed areas (except for small areas) pass through a siltation structure before leaving the permit area.

The coal industry challenged the blanket requirement in OSMRE's rules that all surface drainage from disturbed areas pass through a siltation structure before leaving the permit area,

and in 1985 the United States District Court for the District of Columbia remanded the rules as arbitrary and capricious. Judge Thomas Flannery found that OSMRE failed to adequately explain why siltation ponds were considered BTCA (In Re Permanent Surface Mining Regulation Litigation, 620 F. Supp. 1519, 1565-68 D.D.D. 1985). The decision was supported by record evidence that siltation structures are not always BTCA and OSMRE's recognition that these structures may pose negative impacts. In 1986 (51 FR 419252), OSMRE suspended the rule and explained that the regulatory authority will determine on a case-by-case basis what constitutes BTCA.

In 1990 (55 FR 47430), OSMRE proposed revisions to the federal rules to allow the use of alternative sediment control measures in lieu of sedimentation ponds in the arid and semi-arid west. OSMRE never took further action on the proposal. Currently, it is the responsibility of the regulatory authority to determine, on a case-by-case basis, what constitutes BTCA for preventing, to the extent possible, additional contributions of suspended solids to stream flow or runoff outside the permit area.

1.2.3 State Regulatory Guidelines for Sediment Control

The states of Wyoming and New Mexico, under federally approved SMCRA primacy programs, have developed regulations to allow the use of sediment control BMPs to prevent environmental problems associated with preferential use of sedimentation ponds in the arid and semiarid west. The regulations or guidelines have been reviewed and approved by OSMRE. Utah is developing alternate sediment control guidelines that have not been published to date. Although the requirements for these programs vary somewhat between states, the intent is to provide greater protection to the hydrologically sensitive watersheds in this region.

1.2.3.1 Wyoming Coal Rules and Regulations, Chapter IV

Under Wyoming's Coal Rules and Regulations, implemented by the Land Quality Division (LQD) of Wyoming’s Department of Environmental Quality (WY DEQ), exemptions to

the use of sedimentation ponds may be granted where, by the use of alternative sediment control measures, the drainage will meet effluent limitation standards or will not degrade receiving waters (Chapter IV, Section 2(f)(i)). Chapter IV of these regulations also sets environmental protection performance standards that require coal mine operators to implement best management practices including contemporaneous backfilling and grading, reclamation to approximate original contour, and erosion reduction measurements. Under Chapter IV, Section 2(e)(i), discharges should be controlled as necessary to reduce erosion, to prevent deepening or enlargement of stream channels, and to minimize disturbance of the hydrologic balance.

Chapter IV of these regulations also states that appropriate sediment control measures (e.g., stabilizing, diverting, treating or otherwise controlling runoff) shall be designed, constructed, and maintained using BTCA to prevent additional contributions of sediment to streams or to runoff outside the affected area. Chapter IV requires that a surface water-monitoring program be used to demonstrate that the quality and quantity of runoff from affected lands will minimize disturbance to the hydrologic balance. Wyoming's Coal Rules and Regulations, Chapter IV are provided as Appendix A to this document.

1.2.3.2 Wyoming Coal Rules and Regulations, Guideline No. 15

Wyoming's LQD developed Guideline No. 15 for Alternative Sediment Control Measures (ASCMs) or best management practices that may be used in addition to or in place of sedimentation ponds. The guideline supports requirements of the Wyoming DEQ/LQD Coal Rules and Regulations, Chapter IV and provides guidance for determining best technology currently available for designing, constructing, implementing, and maintaining ASCM, and for determining the contents of an ASCM proposal.

Guideline No. 15 identifies specific sediment control measures that may be used in addition to or in place of sedimentation ponds and supports the use of alternative sediment control measures as an option under Wyoming's Coal Rules and Regulations. Guideline No. 15 recommends: determination of BTCA on a case-by-case basis, prevention of soil detachment and

erosion, retention of sediment as close as possible to its point of origin, and implementation of sediment traps only as a second line of defense. Wyoming's Guideline No. 15 are provided in Appendix B of this document. A summary of the guideline is presented below.

Determination of Best Technology Currently Available

Guideline No. 15 recognizes that design methods, construction techniques, maintenance practices, and monitoring all contribute to a system that can be considered BTCA. Additionally, the guideline recognizes that BTCA must be determined on a case-by-case basis. Factors considered in BTCA determinations include the size and type of disturbance and the length of time the ASCM will be in place. Determination also should be based on how effective the ASCM is at preventing soil detachment and erosion, and how effective the ASCM is on retaining sediment as close as possible to its point of origin.

Design of ASCM (for areas 30 acres and larger)

For sites larger than 30 acres, the mine operator is required to submit a general description of the area to be controlled by ASCM and the types and duration of expected disturbance, including the distance to and type of nearest receiving stream. A description of the sediment control plan, including justification for ASCM design parameter values and date of construction or implementation, is to be included. The use of site-specific data is encouraged. Topographic maps detailing the use of ASCM in relation to the mining and reclamation sequence is required. Annual reports detailing ASCM modifications are required if adjustments are made to the approved permit system. The guideline recommends that the ASCM design be based on predicted sediment loads or yields from the area disturbed compared to predicted or measured native sediment yields. State-of-the-art computer watershed models are recommended for use as a design tool.

Design of ASCM (for areas less than 30 acres)

Sediment control design requirements for small disturbed areas are concerned primarily with establishing use and safety criteria commensurate with the intended use and life of the structures. For these areas, the operator is required to submit the sedimentation control plan and

justification, a plan view location, and a general description of the type of ASCM structures. The sediment control plan should implement sediment trapping structures to pass or detain runoff from storm events such as toe ditches and rock check dams. ASCM proposals for small areas also should present the inspection and maintenance programs the operator will use to regularly evaluate the stability and effectiveness of each ASCM. The program recognizes that the effectiveness and capabilities of many ASCM have been documented and need not be reiterated for small area application.

Implementation Priorities (for post-mining surfaces)

Guideline No. 15 highly recommends ASCM design approaches that stabilize land forms to minimize sediment yield. Short-term slope erosion control methods are recommended, such as regrading, mulching, and rapid establishment of vegetation. The guideline also recommends in-channel sediment retention and removal of trapped sediment. Sedimentation ponds should be implemented when maintenance of ASCMs is a chronic problem.

ASCM Performance Monitoring

Monitoring of small ephemeral receiving streams should include visual inspection following each runoff event, and repeat photographs taken at least annually and after major runoff events. Monitoring of large ephemeral receiving streams should include visual inspection, repeat photographs, repeat surveys, and upstream and downstream sediment yield monitoring stations. Guideline No. 15 recognizes that each type of ASCM has construction and maintenance guidelines that are specified in most handbooks on sediment control. The operator is required to:

> "report, repair and log any significant damage to an ASCM as soon as possible after the damage occurs. The operator should inspect the ASCM at the beginning and at the end of each runoff season, and after each runoff event. An inspection and maintenance log should be kept to document the condition of each ASCM at the time of each inspection. The log should describe any damage, required maintenance, and the date repairs were made."

1.2.3.3 New Mexico's ASC Windows Program

New Mexico's Mining and Minerals Division (MMD) enforces the state's federally approved SMCRA primacy program. BMP regulations for mining and reclamation operations in New Mexico may be found under 19 NMAC 8.2 Subpart 20 Section 2009 which addresses requirements for minimizing changes to the prevailing hydrologic balance in both the permit and adjacent areas. Section 2009 of Subpart 20 is included as Appendix C of this document.

Under New Mexico's program at Section 2009.E (commonly referred to as the "ASC Windows Program"), requirements to pass all disturbed area runoff through a sedimentation pond or series of sedimentation ponds can be waived. If the operator chooses not to operate under the provisions set forth at 2009.E, then all runoff must be passed through sedimentation ponds before leaving the permit area. To waive sedimentation pond requirements, the operator must demonstrate that erosion is sufficiently controlled and that the quality of area runoff is as good as or better than that of water entering the permit area. The regulations recognize that certain methods are capable of containing or treating all surface flow from the disturbed areas and shall be used in preference to the use of sedimentation ponds or water treatment facilities. These practices to control sediment and minimize water pollution include, but are not limited to:

- Stabilizing disturbed areas through land shaping, berming, contour furrowing, or regrading to final contour;
- Planting temporary vegetation that germinates and grows quickly;
- Regulating channel velocity of water and diverting runoff;
- Lining drainage channels with rock or revegetation; and
- Mulching disturbed areas.

The operator's plan for alternative sediment control must demonstrate that there will be no increase in the sediment load to receiving streams. The plan also must demonstrate that there will be no resulting environmental harm or degredation, threat to public health or safety, or

resulting pollution or other diminishment of existing streams and drainages that could cause imminent environmental harm to fish and wildlife habitats. The operator is responsible for taking baseline and ongoing surface and ground water monitoring samples. The MMD may require additional tests and analyses as deemed necessary by baseline and ongoing monitoring results. Surface water monitoring continues until final bond release.

Several mine operations in New Mexico have applied for and received reclamation liability bond releases for lands where sediment control BMP plans were implemented (e.g., Carbon II mine and De-Na-Zin mine). These sites demonstrated that there was no contribution of additional suspended solids to the hydrologic regime of the area and that runoff from regraded areas was as good as or better than runoff from undisturbed areas (WCMWG, 1999a).